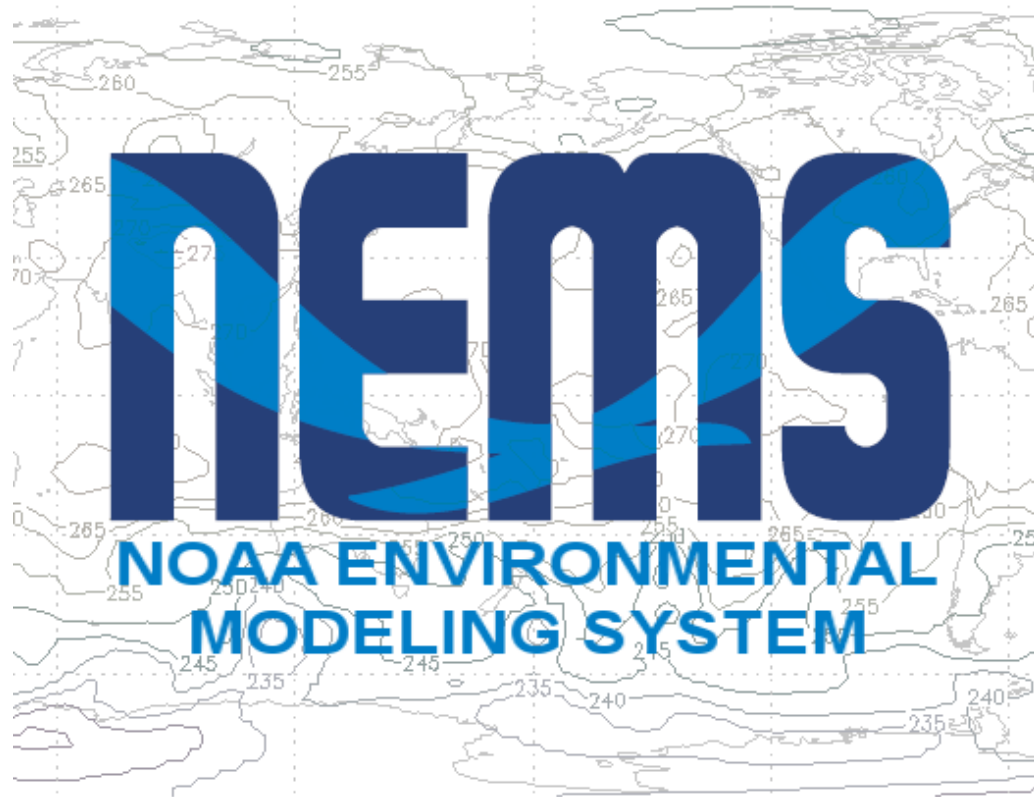




Repository, Execution, Build, and Commit Process

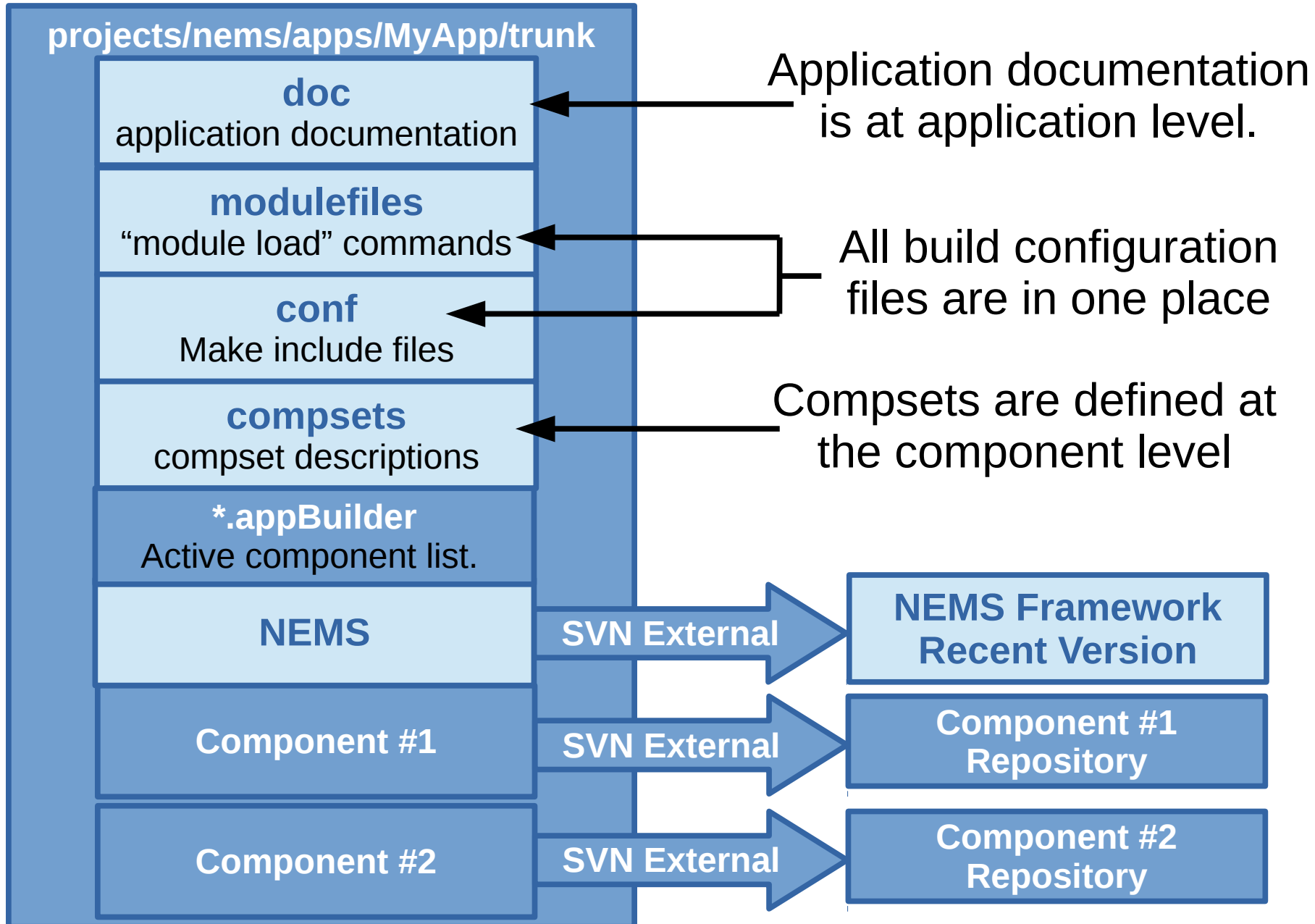
Sam Trahan
NCEP EMC / IMSG
July 19, 2017

Overview

- NEMS Application & Repo
- NEMSAppBuilder
- NEMSCompsetRun
- Regression Tests
- Commit Process

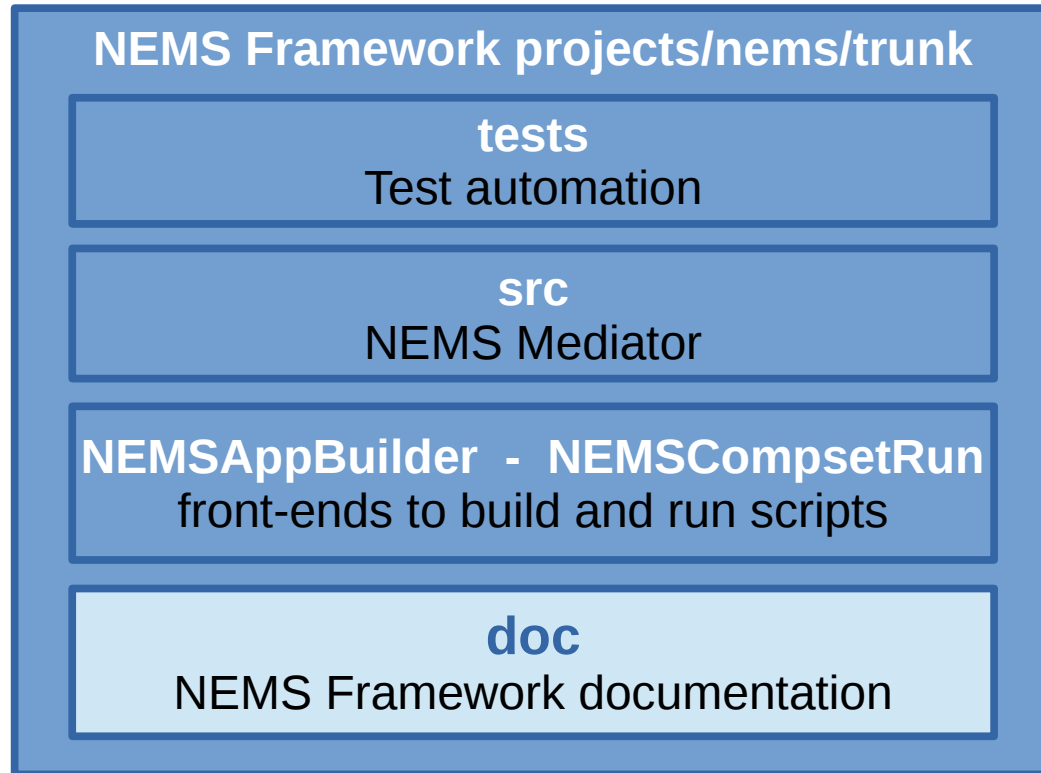
NEMS Repository

Application



NEMS Repository

Framework



- No files specific to application
- Mediator source
- Test & build scripts
- Component-specific build logic

NEMS Repository

Component

NEMS Component
Component source code
Native repo & structure

NEMS Cap
Connection to NEMS Framework

NEMS Framework projects/nems/trunk

NEMSAppBuilder
Component-specific build logic

- In 3 places:
 - Source code in native repo (any structure)
 - Cap connects to NEMS
 - Build logic in NEMSAppBuilder

Compiling NEMS

NEMSApplib

projects/nems/apps/MyApp/trunk

modulefiles

“module load” commands

conf

Make include files

***.appBuilder**

Component list

- **./NEMS/NEMSApplib**
 - interactive mode
- **./NEMS/NEMSApplib**
app=standaloneFV3
 - Non-interactive. Logs to stdout/stderr

1. Component list from ***.appBuilder** file
2. Load modules from **modulefiles/** directory
3. Configure NEMS using **conf/** files
- 4.
- 5.

Compiling NEMS

NEMSAppBuilder

NEMSAppBuilder source

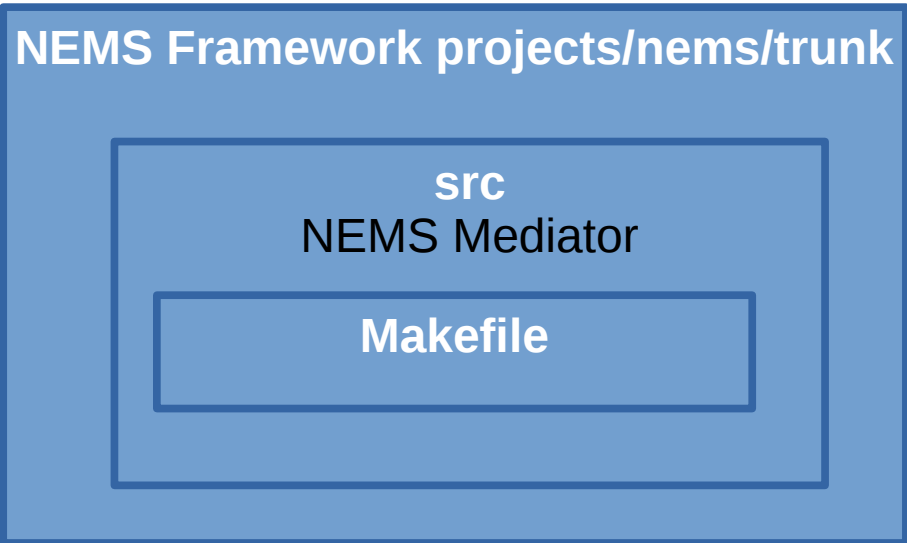
```
build_fv3() {  
    ... builds fv3 ...  
}
```

- `./NEMS/NEMSAppBuilder`
 - interactive mode
- `./NEMS/NEMSAppBuilder app=standaloneFV3`
 - Non-interactive. Logs to stdout/stderr

1. Component list from `*.appBuilder` file
2. Load modules from `modulefiles/` directory
3. Configure NEMS using `conf/` files
4. Build each component using shell function (eg `build_fv3`)
- 5.

Compiling NEMS

NEMSApplib

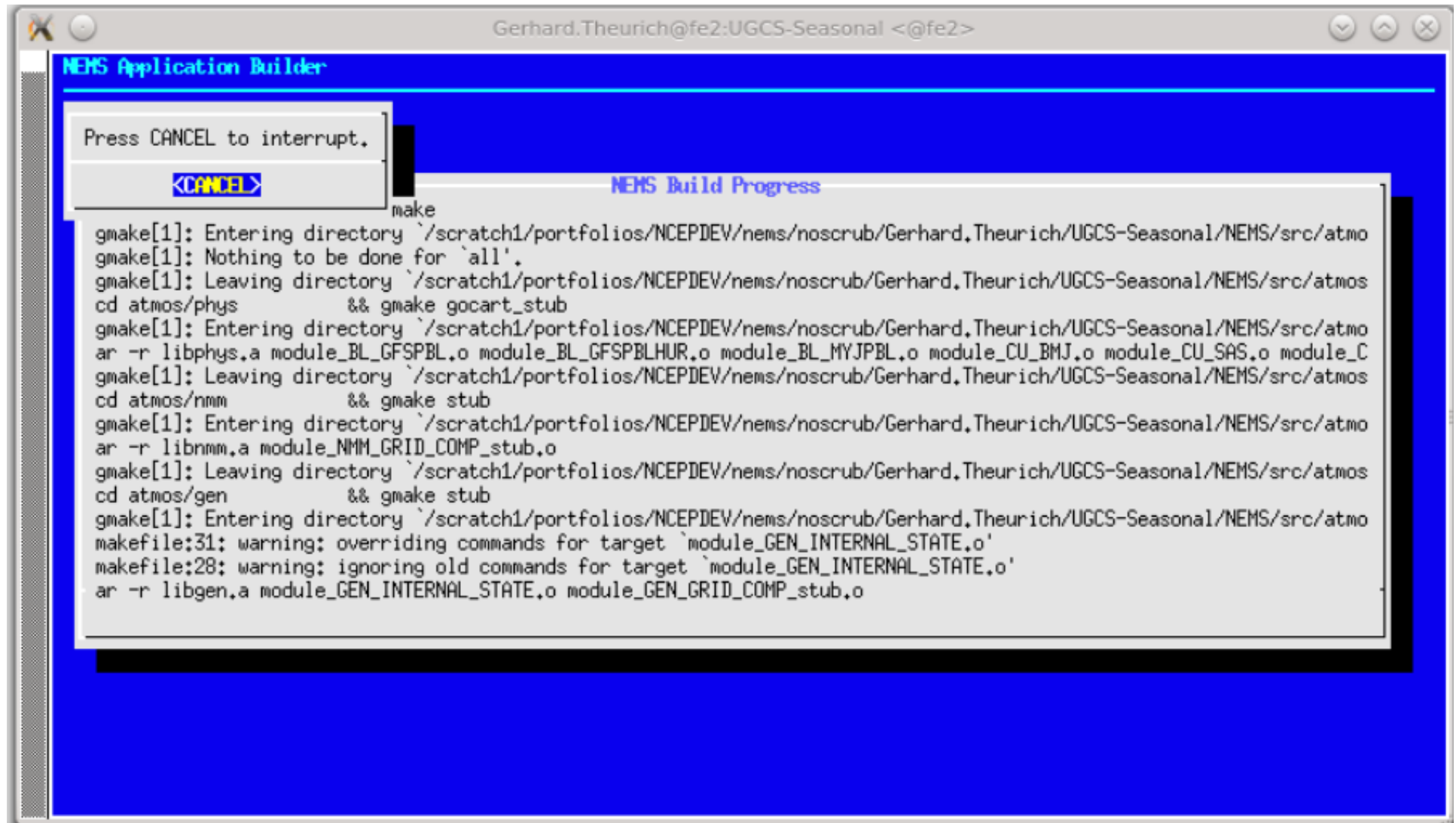


- `./NEMS/NEMSApplib`
 - interactive mode
- `./NEMS/NEMSApplib`
`app=standaloneFV3`
 - Non-interactive. Logs to stdout/stderr

1. Component list from `*.appBuilder` file
2. Load modules from `modulefiles/` directory
3. Configure NEMS using `conf/` files
4. Build each component using shell function (eg `build_fv3`)
5. Build NEMS using `NEMS/src/Makefile`

Compiling NEMS

NEMSAppBuilder

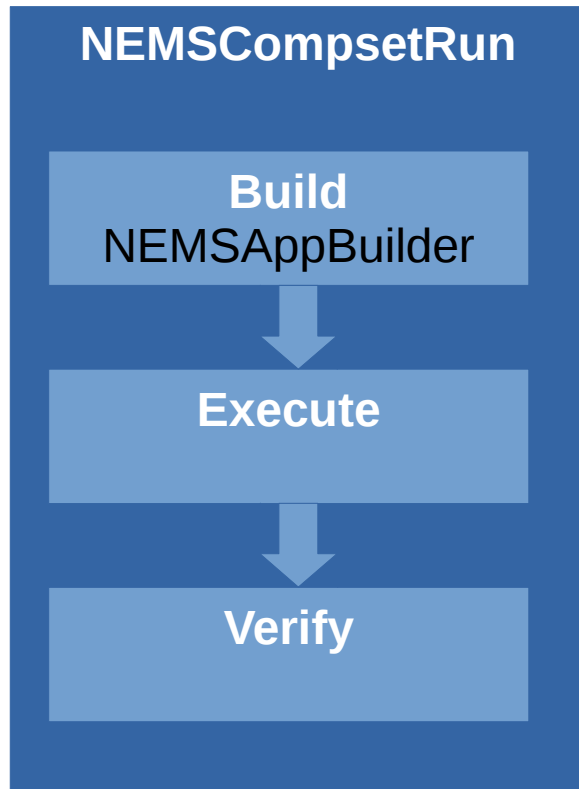


The screenshot shows a window titled "NEMS Application Builder" with a blue background. In the top-left corner, there is a small box with the text "Press CANCEL to interrupt." and a "CANCEL" button. The main area of the window is titled "NEMS Build Progress" and displays the output of a "make" command. The output shows the compiler (gmake) entering and leaving various directories and building object files. The window's title bar includes the name "Gerhard.Theurich@fe2:UGCS-Seasonal" and standard window controls.

```
make
gmake[1]: Entering directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
gmake[1]: Nothing to be done for `all'.
gmake[1]: Leaving directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
cd atmos/phys      && gmake gocart_stub
gmake[1]: Entering directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
ar -r libphys.a module_BL_GFSPBL.o module_BL_GFSPBLHUR.o module_BL_MYJPBL.o module_CU_BMJ.o module_CU_SAS.o module_C
gmake[1]: Leaving directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
cd atmos/nmm      && gmake stub
gmake[1]: Entering directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
ar -r libnmm.a module_NMM_GRID_COMP_stub.o
gmake[1]: Leaving directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
cd atmos/gen      && gmake stub
gmake[1]: Entering directory `/scratch1/portfolios/NCEPDEV/nems/noscrub/Gerhard.Theurich/UGCS-Seasonal/NEMS/src/atmo
makefile:31: warning: overriding commands for target `module_GEN_INTERNAL_STATE.o'
makefile:28: warning: ignoring old commands for target `module_GEN_INTERNAL_STATE.o'
ar -r libgen.a module_GEN_INTERNAL_STATE.o module_GEN_GRID_COMP_stub.o
```

NEMSCompsetRun

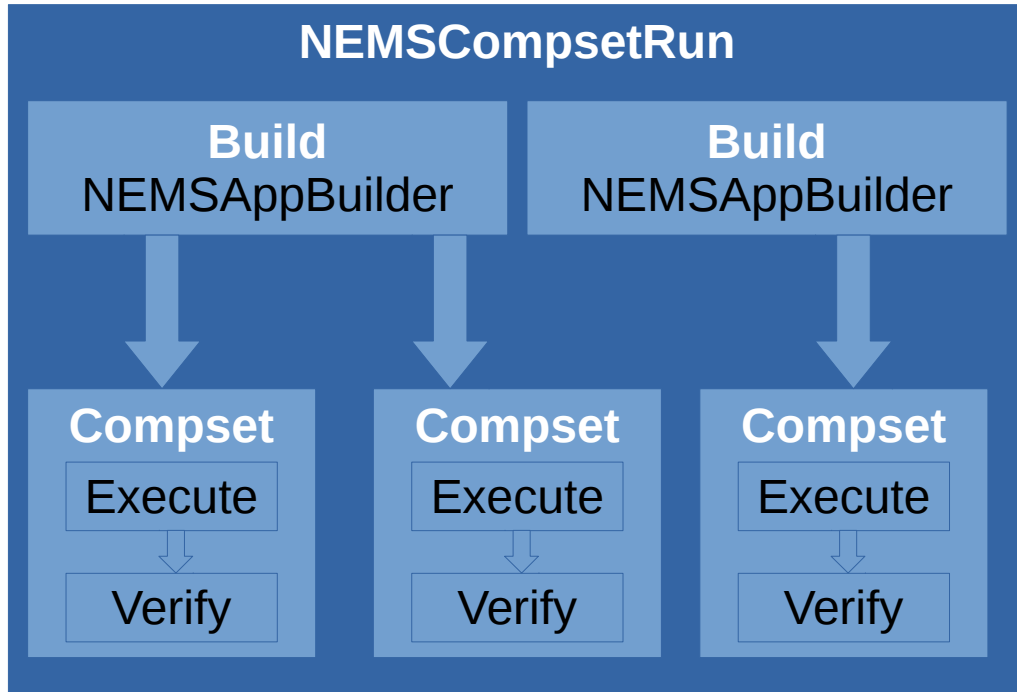
Running NEMS



- **Compset**
 - Coupled **component**
 - **Set**
- **Contains**
 - Specified set of components
 - Inputs
 - Resource spec
 - Baseline

NEMSCompsetRun

Running NEMS



Compset groups

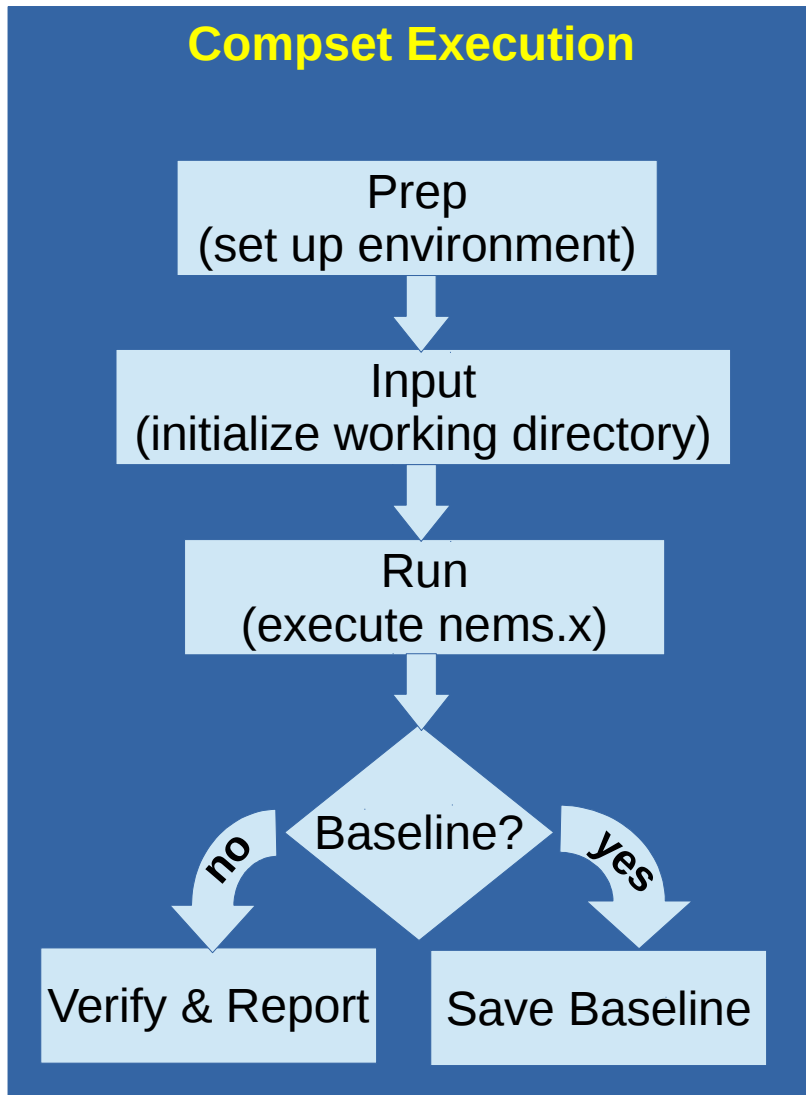
- Run multiple compsets
- Multiple builds

Excellent for regression testing

NEMSCompsetRun

Special Exception for GSM

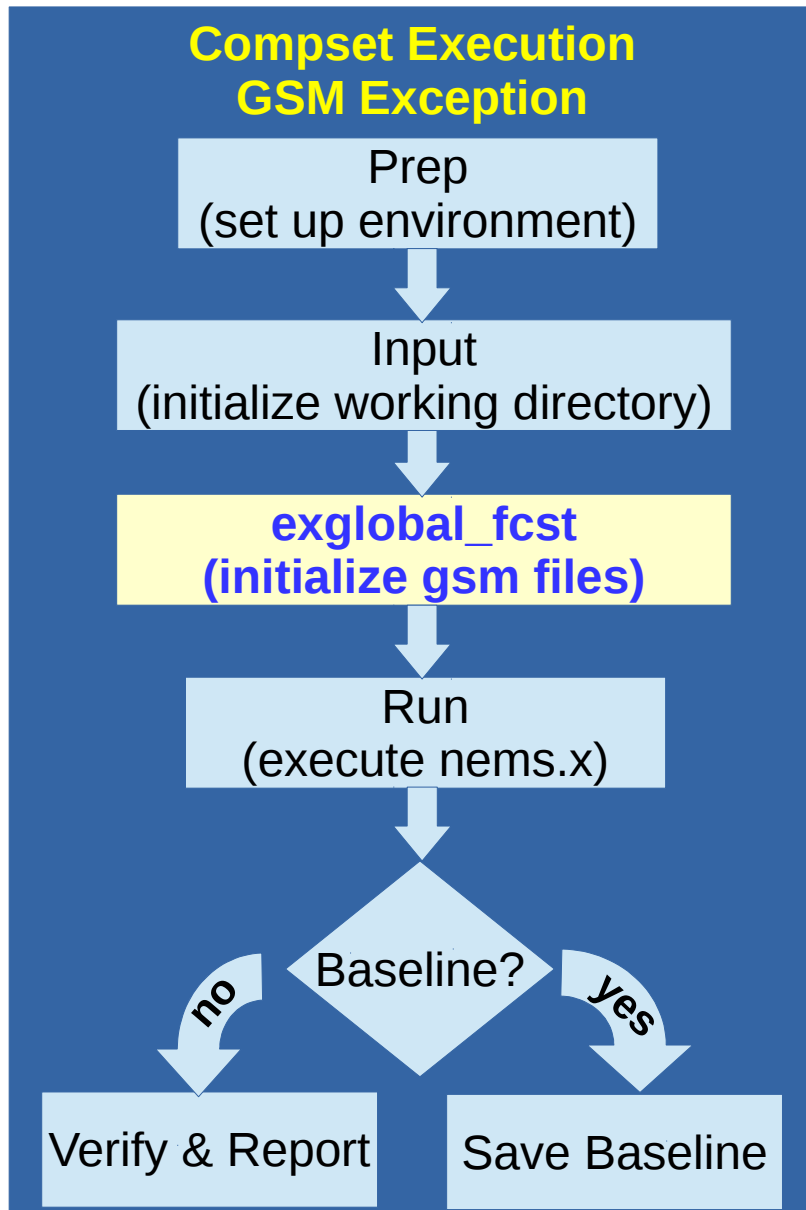
Compset Execution



- NEMSCompsetRun
 - No model workflow scripts
 - Simplifies cross-application, cross-platform, testing

NEMSCompsetRun

Special Exception for GSM



- NEMSCompsetRun
 - No model workflow scripts
 - Simplifies cross-application, cross-platform, testing
- GSM
 - initialization is too complex for users to understand
 - Unfeasible for users to separate input & output from gsm scripts.

NEMS Regression Tests

<http://www.emc.ncep.noaa.gov/projects/rt>

NEMS Regression Tests

Test	Result	Age	Duration
WCOSS NEMSGSM Trunk	PASS	25:22:49	01:01:23
Theia NEMSGSM Trunk	PASS	24:27:56	01:46:54
WCOSS WW3-GSM Trunk	PASS	25:34:49	00:49:27
Theia WW3-GSM Trunk	PASS	01:45:28	00:29:29
WCOSS NEMSfv3gfs Trunk	PASS	25:09:36	01:05:14
Theia NEMSfv3gfs Trunk	PASS	01:34:42	00:41:27

- [Nightly regression tests](#)
- More regression tests will be added in coming weeks:
 - FV3 Jet & WCOSS IBM
 - HYCOM-GSM-CICE
 - GSM-MOM5-CICE

NEMS Regression Tests

<http://www.emc.ncep.noaa.gov/projects/rt>

Theia NEMSfv3gfs Trunk Regression Tests: PASS

Start time: Wed, 19 Jul 2017 00:30:54 GMT (age 02:17:42)

End time: Wed, 19 Jul 2017 01:12:21 GMT (age 01:36:15)

Duration: 00:41:27

Source: [regtest.txt](#). Click on a test or repo for details.

Legend: **CHECKOUT** - TEST **PASSED** - TEST **FAILED** - NEMS

Action	Result	Details (click for more info)
. (top of checkout)	-r 95864	https://svnemc.ncep.noaa.gov/projects/nems/apps/NEMSfv3gfs/trunk
FV3	-r 95134	https://svnemc.ncep.noaa.gov/projects/fv3/trunk
NEMS	-r 95629	https://svnemc.ncep.noaa.gov/projects/nems/trunk
COMPILE	SUCCEEDED	fv3.exe
COMPILE	SUCCEEDED	fv3_32bit.exe
COMPILE	SUCCEEDED	fv3_appbuilder.exe
fv3_decomp	PASS	Compare FV3 decomp results with previous trunk version
fv3_control	PASS	Compare FV3 control results with previous trunk version
fv3_2threads	PASS	Compare FV3 2 threads results with previous trunk version
fv3_stretched_nest	PASS	Stretched grid with nest; compare against previous baseline
fv3_read_inc	PASS	Compare FV3 read_inc results with previous trunk version
fv3_appbuilder	PASS	Compare FV3 with the NEMSAppBuilder against the previous trunk version
fv3_restart	PASS	Compare FV3 restart results with previous trunk version
fv3_stretched	PASS	Stretched grid; compare against previous baseline

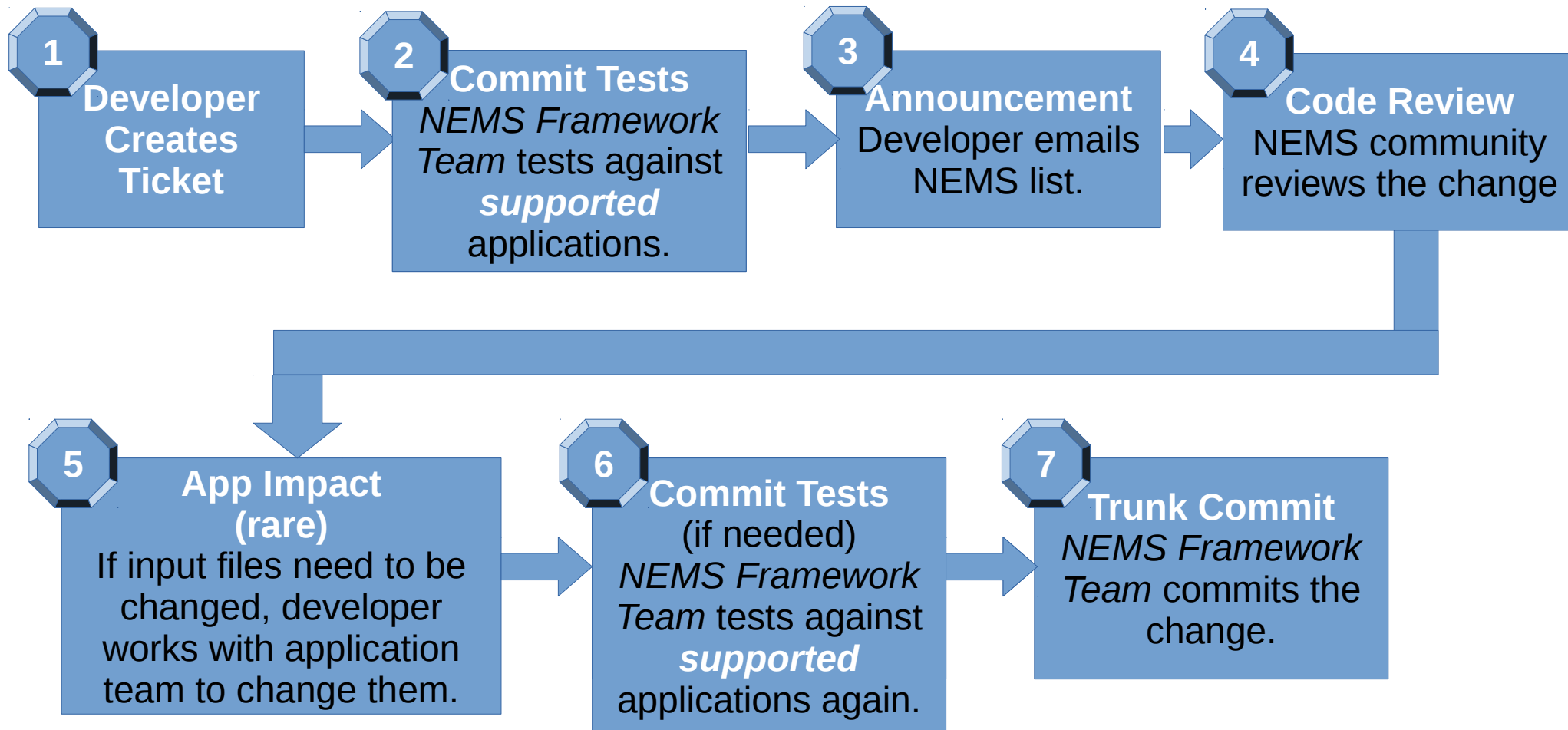
NEMS Regression Tests

<http://www.emc.ncep.noaa.gov/projects/rt>

Action	Result	Details (click for more info)
. (top of checkout)	-r 95864	https://svnemc.ncep.noaa.gov/projects/nems/apps/NEMSFv3gfs/trunk
FV3	-r 95134	https://svnemc.ncep.noaa.gov/projects/fv3/trunk
NEMS	-r 95629	https://svnemc.ncep.noaa.gov/projects/nems/trunk
COMPILE	SUCCEEDED	fv3.exe
COMPILE	SUCCEEDED	fv3_32bit.exe
COMPILE	SUCCEEDED	fv3_appbuilder.exe
fv3_decomp	PASS	Compare FV3 decomp results with previous trunk version • Wed Jul 19 00:53:22 UTC 2017 • atmos_4xdaily.tile1.nc: bit-for-bit identical • atmos_4xdaily.tile2.nc: bit-for-bit identical • atmos_4xdaily.tile3.nc: bit-for-bit identical • atmos_4xdaily.tile4.nc: bit-for-bit identical • atmos_4xdaily.tile5.nc: bit-for-bit identical • atmos_4xdaily.tile6.nc: bit-for-bit identical • nggps2d.tile1.nc: bit-for-bit identical • nggps2d.tile2.nc: bit-for-bit identical • nggps2d.tile3.nc: bit-for-bit identical • nggps2d.tile4.nc: bit-for-bit identical • nggps2d.tile5.nc: bit-for-bit identical • nggps2d.tile6.nc: bit-for-bit identical • nggps3d.tile1.nc: bit-for-bit identical • nggps3d.tile2.nc: bit-for-bit identical • nggps3d.tile3.nc: bit-for-bit identical • nggps3d.tile4.nc: bit-for-bit identical • nggps3d.tile5.nc: bit-for-bit identical • nggps3d.tile6.nc: bit-for-bit identical

Commit Process

Steps



- Ensures *Supported* applications can handle the commit.

Commit Process

Supported Applications

- **Supported Applications:**
 - **Has an application team**
 - at least one person
 - Trunk or “testing” branch:
 - **Points to NEMS Framework trunk head**
 - Has **at least one compset** that **always works**
 - Is maintained by the application team
 - **Actively developed or used**
 - Reasonably **up to date with component trunks**
 - Definition of “reasonably up to date” is outside the scope of this presentation



Commit Tests

NEMS Framework
Team tests against
supported
applications.

Commit Process

Not Supported

- Do applications have to follow the plan?
 - No.
- What happens to apps that don't?
 - NEMS Framework commits will not be tested against the application.
 - Application developer keeps up with changes

Summary

- NEMS Application
 - Repo directory points to framework & components
- NEMSApplicationBuilder
 - Builds NEMS application based on app-level info
- NEMSCompsetRun
 - Runs compsets: set of components & inputs
 - Also used for regression testing
- Commit Process
 - Commit is tested against supported apps
 - To be supported, apps must follow rules